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ABSTRACT

Focusing on counseling programs and support services for increasing the participation of women (postsecondary level) in occupations traditionally dominated by men, a study examined opportunities, needs, and support systems relevant for women seeking to enter either nontraditional professional or nonprofessional occupations. The data collected covered the following categories: opportunities in nontraditional professional occupations; characteristics of women choosing traditional and nontraditional professional occupations; counseling/support services for women in math, science, and management; role models used to increase nontraditional participation; counseling services/resources for college women; counseling services aimed at changing change agents; legislative support for women entering nontraditional occupations; participation of and support programs for women in nontraditional, nonprofessional occupations; and apprenticeship training. Positive trends were identified in several nontraditional occupational fields where female enrollments in professional training have increased during the past decade. Seen as a result of several factors rather than the result of any one programmatic effort, these increases were facilitated by legislation and efforts by states and institutions to recruit more women. Promising projects were identified that aimed at influencing educators, parents, and students to change their attitudes and behaviors. (BM)

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COUNSELING PROGRAMS AND SERVICES FOR WOMEN IN NON-TRADITIONAL OCCUPATIONS

written by

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1978

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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DESC:: *Females; Working Women; Post Secondary Education; *Employment Opportunities; *Affirmative Action; *Counseling Programs; Ancillary Services; Professional Occupations; Skilled Occupations; *Participant Characteristics; Scientific Personnel; Managerial Occupations; Role Models; Resources; Legislation; Change Agents; Recruitment; Program Improvement; Changing Attitudes; Vocational Counseling Apprenticeships; Enrollment Trends; Employment Trends; *Educational Needs; Adults

IDEN:: *Non-Traditional Occupations

FOREWORD

The Educational Resources Information Center on Adult, Career, and Vocational Education (ERIC/ACVE) is one of sixteen clearinghouses in a nationwide information system that is funded by the National Institute of Education. One of the functions of the Clearinghouse is to interpret the literature that is entered in the ERIC data base. This paper should be of particular interest to teacher and counselor educators, college and university personnel, curriculum development specialists, placement directors, and educational researchers.

The profession is indebted to Helen S. Farmer for her scholarship in the preparation of this paper. Recognition also is due Linda Stebbins, ABT Associates, S. Norman Feingold, B'nai B'rith Career and Counseling Services and Ellen Bowers, The National Center for Research in Vocational Education, for their critical review of the manuscript prior to its final revision and publication. Robert D. Bhaerman, Assistant Director for Career Education at the ERIC Clearinghouse on Adult, Career, and Vocational Education, supervised the publication's development and assisted in the editing of the manuscript. Ruth Gordon of The National Center for Research in Vocational Education conducted the computer search and Millie Dunning typed the final draft.

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INTRODUCTION

The focus of this review is on counseling programs and services which encourage women to enter non-traditional occupations and which support those who have entered training or employment in these fields, that is, occupations in which a majority of the workers currently are men. The review does not attempt to cover counseling and support services in elementary and secondary education since these were so well covered recently by Johnson et al. (1977). The review deals with counseling of post-secondary level women in both non-professional and professional training and/or employment.

The studies analyzed were obtained in several ways. The majority were identified through computer searches using a variety of descriptors, such as women, non-traditional, counseling, apprenticeships, higher education, and so on. One hundred and fifteen items were identified as potentially pertinent; of these fifty-nine were sufficiently relevant to be included. In addition, recent issues (since 1970) of the *Journal of Vocational Behavior*, the *Journal of Counseling Psychology*, and the *Vocational Guidance Quarterly* were reviewed in order to identify pertinent research. Lastly, a number of documents in the author's personal library were examined for relevant material.

Many of the counseling items came from evaluation studies of project final reports rather than clearly defined research studies. No attempt was made to be exhaustive with respect to either the evaluation studies or the final reports. However, an attempt was made to include all clearly defined research appearing since 1970.

The audiences for this paper are conceived of broadly, since the most promising approaches found to support women's entry into non-traditional fields appear to be the all-out efforts from personnel associated with these occupations. Counselors sitting in their offices can do little to effect radical shifts in the participation rates of women in such occupations. Therefore, teacher and counselor educators, college and university personnel, curriculum development specialists, placement directors, and educational researchers are encouraged to read and apply this paper's findings to their work.

THE PROBLEM

A major problem facing women today is the single fact that men hold most of the higher paying jobs. One of the reasons for women's lower earnings is the crowding of women into such occupations as nursing, elementary school teaching and sewing (Stevenson, 1973). Crowding tends to reduce their leverage for higher pay demands. In addition, women traditionally have selected occupations that seldom demand after-hours work, work on weekends, travel or heavy physical demands (Oppenheimer, 1968; U.S. Department of Labor, 1973d). Skilled crafts in which men dominate often pay better (e.g., auto mechanic) than those in which women dominate (e.g., beautician) (Briggs, 1974). In 1973, most industries which paid employees less than $100 weekly were dominated by women (Waldman and McEaddy, 1974). Similarly most managers are men (U.S. Department of Labor, 1973b). Professions such as engineering, medicine, and law, all highly paid, are mostly underrepresented by women.

The problems for women who wish to enter occupations in which men are in the majority are complex. More often than not women confront negative attitudes of educators, employers, friends, family, and counselors when they attempt to find support for their occupational preferences. These attitudes to which most women are exposed from childhood on tend to reduce the likelihood that they will grow up with an interest in entering non-traditional occupations--whether or not they have the necessary aptitudes. The existence of negative attitudes in others as well as in women themselves is well documented (Farmer and Backer, 1977 and Farmer, 1978).

Several studies recently documented sex bias in both male and female counselors against women entering engineering and medicine. Both Oliver (1975) and McEwen (1975) describe evidence of counselor bias against women entering engineering. Abramowitz et al. (1976) also found evidence of counselor bias. These researchers invited male and female counselors to rate client profiles for maladjustment. The profiles were varied on sex of client but otherwise were identical. They found that both male and female counselors who scored high on a measure of traditional sex-role orientation attributed more maladjustment to women whose profiles described them as choosing non-traditional occupations compared to identical profiles of men. Lesser (1976) obtained similar results. Tanney and Birk (1976) presented extensive evidence of bias not only of counselors but also in career information materials. Bias continues

to influence the ways counselors, male and female, respond to women expressing interest in non-traditional careers.

Interest seems to be the main stumbling block to women's entry into the crafts in numbers proportional to their actual aptitude. Images of craft occupations are often those of construction workers risking life and limb on high scaffolding or auto mechanics squeezing under the body of a car. Nevertheless, women's interest in and acceptance of work in the crafts recently has increased, as evidenced by their increasing employment in and training for these occupations (Briggs, 1974).

In the non-traditional professions lack of interest is a problem. Astin (1973) reported that women have been taught that it is unfeminine to like mathematics and, thus, often conclude that jobs such as accountant, engineer, and physicist are unfeminine and therefore unsuitable.

In addition to the negative attitudes of others--and sometimes their own, women often lack the necessary skills for succeeding in non-traditional training or employment (Kane, et al. 1977). Kaye and Scheele (1975) found that women often lack management and leadership skills and the ability to initiate new program ideas. Math skills often are underdeveloped (Ernest, 1976), possibly because women are not encouraged to take math--beyond the required courses--in high school and college. Mechanical skills required in engineering are often underdeveloped, as are aeronautical and electrical skills (Heckert et al., 1978).

Perhaps the most pervasive barrier to increasing the participation of women in the workforce, and particularly in non-traditional occupations, is the lack of a popular base for shifting primary responsibilities for child rearing from women to some other person or persons (Poloma and Garland, 1971). The husband at home and the husband who equally shares child rearing probably will continue to be atypical. The implication may be that women have to do more "role juggling" and plan both to work and raise a family. Efforts to optimize women's participation in the workforce first have to address ways of optimizing and streamlining women's child rearing roles. For example, flexible work schedules and permanent part-time work arrangements during the childbearing years would permit women to raise children and keep current in their careers. Improving the quantity and quality of infant care arrangements would facilitate this process.

On the positive side, studies have found that, on the average, women have as much aptitude as men for such occupations as engineering (Durkin, 1972), dentistry (Nyre and Xhonga, 1975), the physical sciences (Astin,

1973) and the mechanical trades (Droege, 1967). Legislation such as Title IX has stimulated recruitment efforts of schools of engineering, law, medicine, and dentistry. Similarly, equal employment legislation has stimulated some apprentice trades to open their doors to qualified women (Carone et al. 1977). The fact that more women are entering training in non-traditional fields has provided role models for young women who might consider such occupations. As social sanctions for women to enter non-traditional occupations increases, the likelihood of their developing an interest in such occupations also should increase. This paper, therefore, will examine (1) the extent to which such supportive factors exist and (2) their effectiveness in increasing female participation in non-traditional fields.

In summary, several critical problems limit women's participation in non-traditional occupations: (1) encouragement by parents, teachers, and employers for women to enter low paying traditional occupations; (2) discouragement by parents, teachers, counselors, and employers for women to enter non-traditional occupations; (3) negative attitudes of women themselves toward entering non-traditional occupations; (4) the frequent lack of skills required by non-traditional occupations; and (5) the multiple role responsibilities of women.

The question must be asked: What kind of support services or programs can reduce the effect of these problems? Several theories and research studies lend support to particular intervention strategies. Many of these lines of research are not directly related to career motivation theory but often include relevant implications. Research on attitude change, for example, suggests that such changes are slow, must be planned carefully, and are more effective if introduced early in the life of the target individual or group (Triandis, 1971). Career development theorists have found that exploratory experiences and activities can facilitate the development of career interests which otherwise might lie dormant (Super, 1969; Osipow, 1973). Role modeling has been found to be effective in changing behavior and attitudes (Bandura, 1969). Some researchers have found that a sense of competence positively affects motivation and lends support to efforts to teach skills prerequisite for entry into non-traditional fields (White, 1973). Provision of social sanctions and resources has been found to be effective in eliciting attitude and behavior change (Farmer, 1977). Theory and research on institutional change process (Havelock, 1973) also is relevant and has been used by at least one project (Hansen, 1978) aimed at increasing women's participation in these fields.

REVIEW OF RESEARCH

OVERVIEW

As indicated, the purpose of this review is to describe support systems for increasing the participation of women in non-traditional occupations. Some systems seek to change attitudes and behaviors of those who influence the social learning of women, e.g., policy makers, educators, parents, counselors and employers. Other systems seek to change the attitudes and interests of women themselves. Still others seek to teach women prerequisite skills for entry and success in such occupations. A few systems provide services such as childcare, financial aid, and information networks.

The review examines the achievement of an interim goal in the larger effort to achieve equality for women in the occupational world. Inevitably, social change such as that engendered by women's increased participation in the work force brings into focus several institutional practices geared to earlier value systems and beliefs (Pifer, 1976). During this transitional period it is appropriate to concentrate equity efforts on those occupations previously dominated by men. Such a focus does not negate the value of occupations traditionally dominated by women but rather seeks to achieve a more sexually integrated work force in which gender ceases to prescribe occupational role.

What follows, therefore, are sections which address the needs and support systems relevant for professional level, non-traditional occupations as well as systems relevant for non-professional level, non-traditional occupations, that is, crafts and technical occupations. Women's changing participation rates in specific non-traditional occupations and those which are expected to grow are presented. A brief description of the aptitudes and personality characteristics of women for each type of occupation (professional and non-professional) also is presented. Support systems are described for each type grouped generally into (a) those which attempt to change the attitudes and behaviors of both women themselves and those who teach, counsel, and employ them and (b) those which focus primarily on changing the attitudes and behaviors of women themselves. The summary of the paper includes implications for practice, pricrities for research, and a concluding statement.

A DEFINITION OF NON-TRADITIONAL OCCUPATIONS

Various authors have used different definitions of non-traditional occupations for women. Some have suggested that non-traditional occupations include those with less than 35 percent female participation (Almquist, 1974); others suggested a 25 percent cutoff (Kane et al., 1976). Nevertheless, the authors agree that non-traditional occupations for women are those in which a majority are men. Most authors use the more conservative cutoff of less than 25 or 33 percent. When the basis for classifying women is given in a study it will be reported; however, frequently it was not reported. In addition to different cutoff points, various terms have been used as synonyms for non-traditional including pioneer role innovator and non conformist. In this paper non-traditional will be used rather than a variety of labels to identify these occupations.

OPPORTUNITIES IN NON-TRADITIONAL OCCUPATIONS

Non-traditional professions for women include engineering, law, medicine, dentistry, mathematical sciences, social work, clergy, pharmacy, and architecture. Blitz (1974) presented historical data on the participation of women in these occupations. (See Figure 1.)

Department of Labor trend data (1978) indicated that for all but law and the Protestant clergy, these professions will offer good employment opportunities through 1985. (See Table 1.)

The employment outlook for lawyers is predicted to be "keen" for salaried positions and "moderate" for those who establish their own practice. The outlook for the Protestant clergy is predicted to be keenly competitive.

Recruitment efforts to increase enrollments in non-traditional vocational and college training programs have been reviewed by the Project on the Status and Education of Women (1977). Such efforts appear to be contributing in some degree to increased enrollments, although to give them all the credit would be overstating the case. Increases in enrollments in some of the professional non-traditional occupational fields groups over the past eight to twelve years are presented in Table 2. Increases in medicine and law has reached over 22 percent. Engineering, however, still had less than 10 percent female enrollment and dentistry only 3 percent (Parrish, 1974).

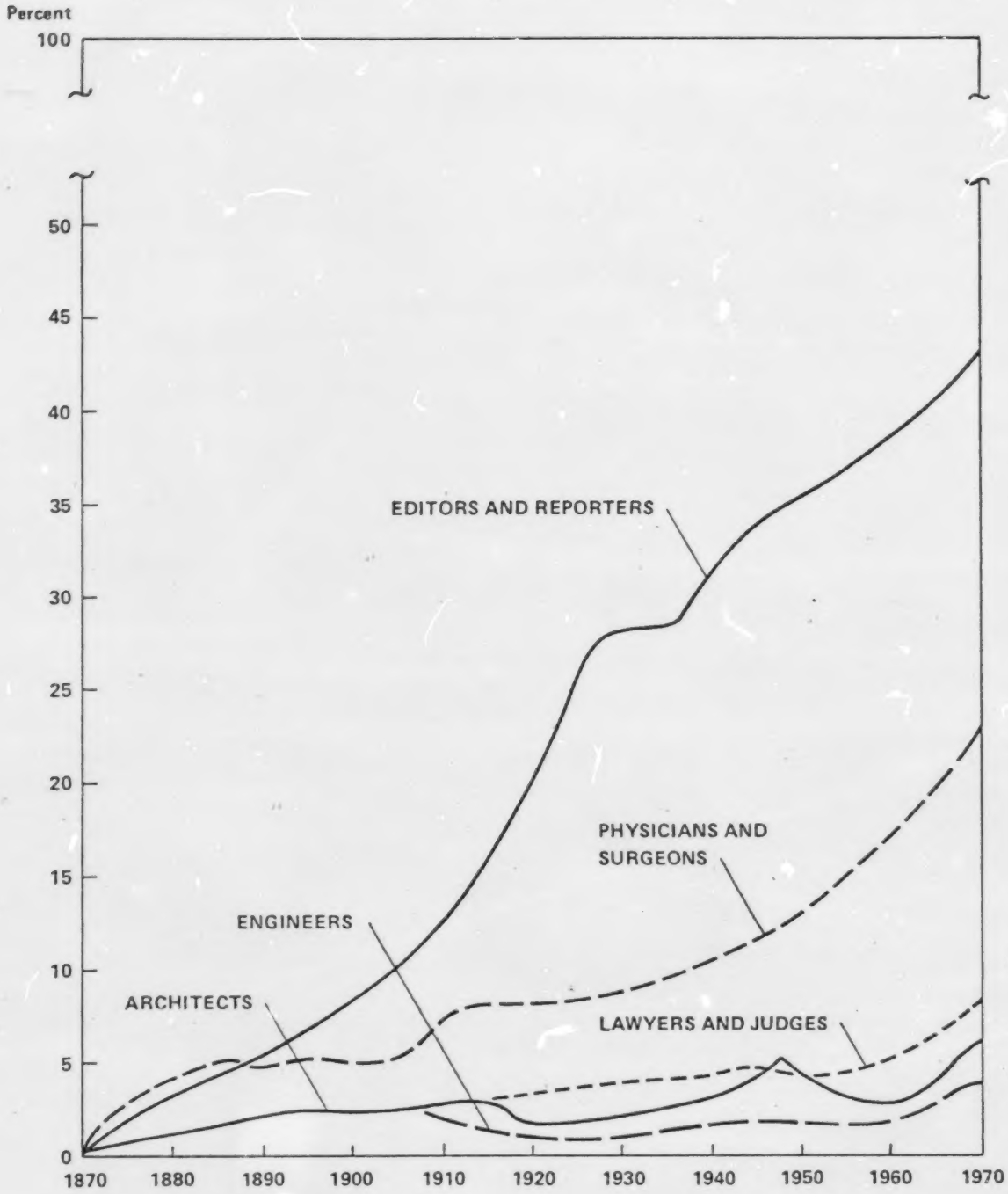

Figure 1: Women in Selected Professions, 1870–1970

Note: Similar trends are indicated for social workers and clergymen, photographers, designers and draftsmen, pharmacists, and dentists.

Table 1. Selected Expanding Professional Occupations: Average Annual Openings to 1985

Professional Occupations	Total Employment-1976	Women as Percent of Total	Average Annual Openings-to 1985
Accountant	865,000	20	51,500
Architect	49,000	4	3,100
Chemist	148,000	7	6,300
Civil engineer	155,000	*	8,900
Dentist	112,000	2	4,800
Dietitian	45,000	90	2,800
Economist	115,000	10	6,400
Electrical engineer	300,000	*	12,800
Industrial engineer	200,000	*	10,500
Life scientist	205,000	10	12,000
Mathematician	38,000	10	1,000
Medical record administrator	12,300	***	1,000
Personnel & labor relations worker	335,000	25	2,300
Physician	375,000	7	21,800
Physicist	48,000	4	1,100
Psychologist	90,000	25	5,600
Public relations worker	115,000	25	8,300
Recreation worker	85,000	50	n.a.
Registered nurse	960,000	99	83,000
Rehabilitation counselor	19,000	30	n.a.
School counselor	43,000	**	1,500
Social worker	330,000	**	25,000
Speech pathologist and audiologist	38,000	75	2,900
Statistician	24,000	33	1,500
Veterinarian	30,500	2	1,800

* Majority are men
** Data are not available for women
*** Majority are women
n.a. Estimate not available

Source: U.S. Department of Labor, Spring, 1978

Table 2. Percentage of Women Enrolled in Selected Non-Traditional Fields

Selected Fields	(1969-1971) Percentage	(1975-1977) Percentage
Medicine	9.0	22.0
Law	7.5	23.4
Engineering	3.0	9.0
Dentistry	1.4	7.0

Note: Percentages based on Project on the Status & Education of Women (1977) and Parrish (1974)

A PROFILE OF WOMEN CHOOSING TRADITIONAL AND NON-TRADITIONAL PROFESSIONAL OCCUPATIONS

In general, women choosing non-traditional professional occupations were found to be more independent in attitudes and behaviors, were more committed to their careers, held interests patterns similar to men in the same non-traditional occupations, and espoused more non-traditional views of their role than those who choose traditional occupations. Several studies measured women's differences on such variables as sex-role orientations, internal vs. external locus of control, and independence vs. dependence.

Karman (1973) found eleven distinguishing features contrasting senior college women choosing non-traditional and traditional occupations (N=469). Briefly, non-traditional women (1) come from homes with a higher income, (2) have mothers who reached higher levels of education, (3) are more theoretically oriented, (4) hold more liberal attitudes toward the role of women in society, (5) are higher achieving students, (6) express a stronger liking for science and mathematics, (7) maintain higher academic records in college, (8) tend to have more communication with members of the faculty insofar as the academic and vocational aspects of their lives are concerned, (9) see their college experiences more in terms of vocational and liberal educational benefits, (10) participate in college to a greater degree

in social science and academically oriented activities, and (11) are less involved in artistically creative activities. (Karman, 1973, p. 40-41). She found differences that not only were psychological but sociological as well. For example, the non-traditional women came from higher socioeconomic class homes and had mothers with higher levels of education.

Moore and Veres (1976) studied women choosing non-traditional careers and characterized them as having higher college grades and planning to have fewer children. Walsh, Horton and Faffey (1977) studied the interest patterns of employed men and women in three non-traditional female occupations (engineering, medicine, and the ministry). They used Holland's Self Directed Search and Vocational Preferences Inventory to measure interest types and, using raw scale scores, found no significant differences between men and women's mean scores within occupations. Although the sample was small (engineers; 31 male, 41 female; physicians; 14 male, 38 female; ministers; 21 male, 30 female) and most subjects had had at least two years experience in their occupation, the results are significant since they run counter to several earlier findings (Johansson and Harmon, 1972; Campbell, 1974; Roth, Hanson, and Cole, 1973; and Prediger and Hanson, 1976). Campbell (1976) obtained a similar lack of differences in the interest patterns of male and female lawyers. Diamond (1975) reported that sex differences in response to interest inventories were less important for professions at the high end of the occupational scale but remain important at the middle and lower end. Counselors may conclude tentatively that interest inventories are less sex biased for women interested in higher level professions. Sex bias in interest inventories has been reviewed thoroughly in a series of articles in Diamond (1975) and by Tittle and Denker (1978).

Tipton (1976) studied female undergraduates comparing those with a traditional sex role orientation with those holding a "contemporary" orientation as measured by Spence and Helmreich's (1973). He compared subjects scores on the Strong Campbell Interest Inventory (Campbell, 1974) with their sex role orientation scores and found that "contemporary" women chose significantly more non-traditional professional level occupations compared with traditional sex role women. Professions in which "comtemporary" women scored higher included law, professor, physicist, veterinarian, and army officer. Traditional sex role women scored significantly higher on nurse, elementary teacher, dental assistant, secretary, department store salesperson, home economics teacher and librarian, i.e., traditional occupations. Traditional sex role women also scored significantly higher on Holland's (1973) conventional personality type.

Burlin (1976) studied the relationship of internal vs. external locus of control variable (Rotter, 1966) and females' choice of traditional and non-traditional occupations. Internally controlled persons (I-type) view themselves as in control of their own destiny and more independent and initiating; externally controlled persons (E-type) view themselves as lacking control over their own destiny and more determined by others and by their environment. They also are characterized by more dependent behavior. Internally oriented females were found, as expected, to choose significantly more non-traditional occupations compared to externally oriented females. Gable, Thompson, and Glanstein (1976) replicated this study and its findings.

Burlin also reported on female subjects' selections of "ideal" and "real" occupational choices. She compared these sets of choices for I-type and E-type women and found both preferred more non-traditional occupations for their "ideal." Burlin concluded that, given some external sanction for non-traditional career choices, E-type women would choose to enter these careers more frequently. She also concluded that they were more environment bound and less able to choose an occupation not commonly sanctioned by society for their sex.

Several researchers found, as did Berlin, that women who choose non-traditional occupations were more independent but, in addition, were more committed to their careers. Wolkon (1972) found that women in non-traditional occupations were more motivated to work and valued independence and mastery of a task more than women in traditional occupations. Almquist (1974) and Marecek and Frasch (1977) similarly found women choosing non-traditional occupations demonstrating higher career commitment than those who chose traditional occupations. Contrary to earlier studies, Almquist also found that women choosing non-traditional occupations were not daughters of rejecting parents nor were they socially isolated in their development. Her findings indicated that women choosing either traditional or non-traditional occupations did not differ on the dimensions of "relationship with parents" or "sociability preferences." Tangri (1972) found women choosing non-traditional careers were more independent, autonomous, and motivated to perform at their full potential compared to those choosing traditional occupations.

Angrist (1972) found that women choosing non-traditional occupations have high career commitment and that they avoid joining sororities when in college. Her non-traditional women all wanted to have a family but viewed child rearing as a role to be shared with others, if necessary, in order to pursue their careers in an uninterrupted manner. Angrist's subjects were undergraduate college women who entered college in the late 1960's. They represented 18 percent of the college population studied at a private university for men and women.

Astin (1976) found the personal characteristics of women choosing non-traditional occupations to be characterized by high levels of career commitment, including the belief that their career would contribute to their personal satisfaction. Her subjects were a selected group of women in continuing education classes. They were characterized further as women with liberal views about the age of children when a mother should involve herself outside the home. They described themselves as dissatisfied with homemaking as their only work role. They also had husbands who supported their combining home and work roles.

COUNSELING SERVICES FOR WOMEN IN MATH AND SCIENCE

Most support programs to increase the participation of women in non-traditional math and science occupations have been aimed at skill building, attitude change, and anxiety reduction. Few support programs were found aimed at changing the attitude of teachers, counselors, policymakers and employers in this regard.

Astin (1973) reported that many women with aptitudes in mathematics obtain graduate degrees in fields other than math or the natural sciences. She also presented data that more women obtain bachelor's and master's degrees in math than in the natural sciences. (See Table 3.) The comparison between men and women in these fields show

Table 3. Comparison of Degrees in Mathematics and the Natural Sciences

	Natural Sciences		Mathematics	
	Percentage of Women/ All Fields	Percentage Compared to Men	Percentage of Women/ All Fields	Percentage Compared to Men
BA Level	1.1	13.5	3.1	43.3
MA Level	1.0	10.2	2.3	24.3
Ph.D. Level	6.6	4.7	2.4	7.1

Source: Koontz, 1972

women highly underrepresented. Since science needs more trained persons, (U.S. Department of Labor, 1978) women with math and science aptitudes need to be encouraged to choose scientific careers early in their academic training.

Astin's paper, incidentally, was one of several presented at a 1973 Massachusetts Institute of Technology workshop in which over one hundred men and women scientists in higher education, industry, and government attended. The purpose of the workshop was to plan ways to open up opportunities for women in science and technology.

In recent years there has been increased interest in uncovering whether or not girls have less mathematical ability than boys. Research reported by Astin (1973) indicated that achievement differences usually appear after the onset of adolescence and are mainly a result of differential reinforcement rather than inherent biological differences between the sexes. She also noted that motivational differences are reported in the elementary school years. As a result, direct efforts to counter social conditioning have been developed in some elementary and secondary schools (Project on the Education and Status of Women, 1978).

Ernest (1976) reported that an association for women in mathematics was formed in 1971. (Interested persons may contact Mary Gray at Wellesley College, Wellesley, MA 02181.) The association issues a regular newsletter and runs an employment information service. In addition, The American College Testing Program (1976) published a book intended to increase the interest of women in scientific careers.

Some campuses have instituted programs lasting from one to six weeks in which female high school seniors live on college campuses (Project on the Status and Education of Women, 1977). The programs include regular coursework in math, physics, biology, and other science areas taught by faculty members. In addition, such programs sometimes include visits to places of employment and meetings with women employed in various science fields.

The National Science Foundation made grants totaling approximately one million dollars to support careers for women (On Campus With Women, 1976). With this funding, seventeen workshops were held during the early 1970's, with more than 6,000 undergraduate and graduate participants. Several workshops were aimed specifically at women who earned their master's or bachelor's degree in science between two and fifteen years ago and who currently are not employed in any scientific field. The workshops were intended to upgrade the knowledge and skills of these women in order to make them competitive for jobs in such fields. Financial aid for child care also was offered.

Ernest (1976) described programs aimed at reducing math avoidance in women. For example, he noted that IBM funded a program in which female mathematicians visit high schools giving lectures aimed at motivating girls to study math and at informing guidance personnel of the important role math plays in keeping non-traditional occupations open as career options. Ernest recommended that colleges and universities offer pre-calculus credit courses. He also reported that women students at the Massachusetts Institute of Technology have compiled a book about opportunities for women at MIT. The result was a 400 percent increase in requests for more information compared to the previous year. At Mills College (Oakland, California) a special recruitment effort resulted in doubling mathematics enrollment.

The Math Anxiety Clinic at Wesleyan University (Tobias, 1976) combined math skills with learning how to cope with anxiety. Such clinics for women have developed at the high school, college, and out-of-school levels. They recruit women interested in occupations which require mathematics ability. Tobias, who has worked with college women, reported some success in reducing math-phobia and in increasing enrollment in non-traditional training for women. Other efforts are aimed at training teachers in ways to decrease math-phobia in girls. On Campus With Women (1976) listed two other special programs for college women--one at Wellesley College in Massachusetts and the other at the University of Michigan.

COUNSELING TO SUPPORT WOMEN IN MANAGEMENT

Support programs to increase the number of women in management roles have been aimed largely at recruiting women into training programs or at skill training in assertive and leadership behaviors.

There are significantly fewer women in management and administrative positions than men. However, their increased participation, from 13.6 percent in 1950 to 19 percent in 1973 indicates a positive trend. Commenting on this trend, Kahne (1974) suggested that the shortage of men in the thirty-five to forty-five age range in the 1970's (reflecting the lower birth rates during the Depression) will make women in this age category more in demand for management positions. In addition, federal legislation, such as Affirmative Action and Title VII of the revised (1972) Civil Rights Act, requires government contractors to actively recruit women for management openings and employers to make management training programs open to women employees.

The Women's Bureau of the U.S. Department of Labor (1973b) reported that rapid growth is expected for several administrative and management occupations. For women with master's degrees in public or municipal

administration, positions such as purchasing agent, bank officer, and city manager will be areas of expanding opportunity. The 1978-79 *Occupational Outlook Handbook* (U.S. Department of Labor, 1977) description of these occupations also is encouraging for women, especially as bank officers since the most rapid employment growth is expected here. As an example, The Bank of America in California has pledged to increase its female bank officers to represent forty percent of their total workforce by late 1978.

Most writers (Ginsberg and Yohalem, 1973; Kahne, 1974; Loring and Wells, 1972) agree that women's absence from management positions is largely due to the combined attitudes of women themselves and of employers. Women do not enter management training as frequently as men, nor do they aspire as often to be managers. This is partly because these roles frequently require long hours, evenings and weekends, and the willingness to travel. This type of occupation traditionally does not fit well with women's dual roles. Employers themselves view women as less desirable candidates for similar reasons.

On Campus With Women (May, 1975) reported that the School of Management at Boston University developed a special program to recruit women students and to increase the women faculty. In 1975, seventy-five percent of the women enrolled in this program had school age children, a fact made possible by special child care provisions.

Several studies (Basil, 1972; Day and Stogdill, 1972; Taylor, 1973) indicated that women managers perform as well as men on management competency measures. In addition, Basil (1972) found that men who had exposure to female supervisors or managers are more positive about women in management than those who have not. Such evidence may encourage employers to promote women to supervisory positions when merited. It also should encourage women to enter management when their interests and aptitudes point them in that direction.

SUPPORT SERVICES AND COUNSELING FOR WOMEN ENROLLED IN ENGINEERING

Heckert et al., (1978) described a program, at Purdue University for women engineering students, which lasts throughout the year for entering women who may participate in any or all of three modules. The first is lab experiences intended to help women obtain familiarity with mechanical, electronic, and aeronautical skills; the second is a series of lecture-discussions led by a variety of female role models, specialists in various engineering disciplines; the third includes the use of interest inventories, self-exploration, and aptitude tests. Only women who were undecided as to major field of

engineering were included in the planning sessions. Findings from the first year indicated that participating women report increased self-confidence in their technical knowledge and laboratory skills. Based on evaluative feedback, the modules were modified somewhat following the first year and were continued in 1977-78. (Interested persons may obtain details by writing the authors at Purdue University.)

ROLE MODELS USED TO INCREASE NON-TRADITIONAL PARTICIPATION

Follett et al., (1977) reviewed several support programs which have used role models to increase the motivation of women toward non-traditional occupations. Elliott (1973) studied the effect of videotape models on the career motivation level of thirty college women. The tapes showed women who filled the multiple roles of mother, homemaker, and worker, and where their work roles were high level and non-traditional. Twelve thirty-minute videotapes were used with the women who scored low on a career motivation measure. The showing of each tape was followed by discussions at which time the women examined their attitudes toward and ideas about the video models. Following this treatment, the subjects scored significantly higher on the career motivation measure than did the non-treatment group. The Project on the Status and Education of Women (1977) invited women who were successful in a non-traditional field to live on campus as models and mentors. While in residence they taught, talked informally with small groups, and presented lectures.

The effectiveness of modeling for increasing participation in non-traditional occupations has been studied by Almquist (1974), who found that exposure to role models increased the career commitment of women enrolled in such occupations. She also found that mothers of women who choose non-traditional occupations had higher levels of education and were more likely to have worked while their daughters were growing up than mothers of women choosing traditional occupations. Hurwitz and White (1977), working with high school girls, were able to increase significantly the number of high status occupations (based on educational level and earnings) which are considered appropriate for females. Their work was with an experimental group exposed to occupational information about women in innovative roles. The treatment lasted less than an hour but was found to be effective in changing the beliefs of the experimental subjects. Previously, Plost and Rosen (1974) obtained similar results using a film presentation of a woman in a non-traditional occupation as the experimental stimulus.

Women students currently enrolled in non-traditional training programs may be used in several ways for recruitment purposes (Project of the Status and Education of Women, 1977). Sometimes they are invited to

career workshops to act as mentors, models, and sources of information. They often visit high schools to talk with counselors, teachers, and female students. When new students enroll in a non-traditional field, an advanced female student in the field may be assigned as a "buddy" in order to provide support services. The goal is to increase retention rates and reduce the frustration experienced by women students who may not be familiar with being a member of a minority group.

COUNSELING SERVICES AND RESOURCES FOR COLLEGE WOMEN

Many college programs schedule a one or two day workshop for female high school seniors (Project on the Education and Status of Women, 1977). The program often consists of films, exhibits, interviews, and discussions with women in non-traditional fields and tours of the campus training facilities. Information is provided on financial aid, prerequisites, and admission procedures.

Special career planning programs for women re-entering either higher education or employment after an absence have been effective in increasing self-confidence and providing women with skill training in career planning and job searching. Such programs were reviewed extensively by Tittle and Denker (1977) and were found to increase appropriate career choices for those participating.

Kaye and Scheele (1975) surveyed sixty support programs aimed at increasing the career options for college women. The programs were intended to teach life planning and assertion skills as well as ways to interact with support groups. Other areas taught included management and leadership skills, writing proposals, managing finances, and making public presentation.

A career counseling program at a community college was evaluated by Blimline (1976). Her findings suggested that short-term counseling, that is, three one-hour sessions, may not be effective in increasing the number of non-traditional occupations considered by women. She studied a career counseling treatment focused on clarifying the extent of sex-role stereotyping and ways of encouraging women to free themselves of such stereotypic beliefs and compared them to traditional treatment which helped women focus on personal interests and aptitudes and which encouraged them to relate these to occupations (see Birk and Tanney, 1972). No significant differences were found between control and experimental subjects in the number of non-traditional occupations selected at the end of the treatment. Blimline suggested that a more intensive treatment was needed to effect significant changes in the choices of women, namely, changes in their vocational histories beginning at a very early age.

Cooper (1976) attempted to demonstrate increased consideration of non-traditional careers by college undergraduates by using four treatment combinations and two interest measures: The Strong Campbell Interest Inventory-SCII-(Campbell, 1974) and the Vocational Card Sorts-VCS-(Dewey, 1974). The SCII is a well known measure of career interests relating to more than one hundred occupations. The VCS is a card sort in which the student sorts a list of occupations into three piles: "would not choose," "in question," or "might choose." They further sort each into subgroups according to reasons for their selection. The final step involves selecting and ranking the ten most preferred occupations from "might choose." She used the Auxiliary Informative Material-AIM-(Birk and Tanney, 1972) procedure to raise the consciousness of subjects concerning fifteen "myths" about women and work. The procedure called for response to each "myth" as true or false. The use of a "latent image" pen permits uncovering the "facts" related to each myth. Cooper's treatments used various combinations of these procedures: SCII alone, SCII plus AIM, VCS alone, and VCS plus AIM. Her results indicated that the volunteer subjects considered significantly more non-traditional occupations compared to control subjects for only one of the treatment conditions, the vocational card sort ($p < .05$). However, the subjects in the AIM conditions obtained significantly higher scores on a measure of career commitment (Angrist, 1972) than control subjects or subjects exposed to the VCS or SCII without the AIM procedure. Subjects in the VCS conditions also demonstrated more occupational information seeking behavior (Zener and Schnuelle, 1972) following the treatment than subjects in the SCII or control condition, thereby suggesting that the vocational card sort procedure stimulates exploratory activities in women.

CATALYST is an organization dedicated to helping women with career planning and job searching. (Several self-help booklets are available from this organization at 14 East 60th Street, New York, NY 10022.) Booklets are addressed to specific non-traditional occupations, such as engineering and accounting. The philosophy of these booklets is to help undergraduate women bring their goals into focus, develop realistic plans in a field for which their personal attributes and interests suit them and for which there is a job market. Although no formal evaluation of the effectiveness of these booklets is available, several directors of counseling centers apparently find them to be helpful.

The College Entrance Examination Board has developed a resource (Scholz, et al., 1975) to help women consider a wider range of occupations than they might have. In 1974, the Women's Educational Equity Act established a federal program to promote educational equity. One objective was the establishment of a communications network to provide educators --both researchers and practitioners--and the general public with information about research and demonstration projects. The communications network is operated by the Far West Laboratory in San Francisco.

A recent mandate to the National Institute of Education (1978) from its policymaking body, the National Council on Educational Research, stated: "It shall be the policy of the National Institute of Education to increase the participation of minority persons and women in the research and development efforts of the nation through ensuring that qualified minority firms and individuals and qualified women are given informed opportunity to participate in NIE programs, and through efforts to increase the numbers, qualifications and performance of minority firms and individuals, and women engaged in education R. & D." (p. 2). Since educational researchers are largely male (Astin, 1976), support from NIE to increase the numbers of women researchers is highly promising since $1.5 million has been set aside for funding in this area during FY 1978.

COUNSELING SERVICES AIMED AT CHANGING THE CHANGE AGENTS

Some support programs combine an emphasis on effecting change in teachers, counselors, employers, and policy makers with changing the target women.

Nyre and Xhonga (1975) described a program designed to increase the enrollment of women in dentistry at U.C.L.A. In 1972, 7.5 percent women were enrolled in the dentistry school; by 1974, this increased to 20.8 percent. This dramatic increase was facilitated by an outreach program in which pamphlets were distributed to counselors and potential women candidates, articles and interviews were published in local newspapers, and media coverage used a slide/tape presentation, "Women in Dentistry." The aid of a national sorority for women dentists also was enlisted. Women faculty in the School of Dentistry visited high schools and undergraduate departments to talk with female students. Information at these meetings included facts on female aptitude for dental work, indicating that women were as equally competent as men in this profession. Data were presented from other countries (e.g., Finland has eighty percent female dentists). The report concluded that recruitment efforts will be successful if comprehensive information is available for potential candidates and if support is provided by concerned faculty, administrators, practitioners and significant other persons in these women's lives.

The project BORN FREE (Hansen, 1978) sponsored by the Women's Educational Equity Program, the Department of Health, Education, and Welfare, is aimed at changing career socialization for both sexes in order to increase the type of options considered by both. The primary goal of this two-year project is to change educational environments in ways that will facilitate sex-free career exploration, planning, and choice. The project, currently in its second year, involves psychologists,

educators, and parents working in elementary through postsecondary institutions to reduce career-related sex role stereotyping. Printed materials and video tapes have been developed for use in training educators, parents, and students.

Several assumptions undergird this project, for example:

- Inasmuch as both women and men affect and are affected by the other's career decisions (one sex cannot redefine its roles without affecting the other), both must be integrally involved in training for reducing sex role stereotyping and resocializing sex roles.
- Since both women and men face barriers in their career development because of stereotypic attitudes about sex roles in work and family, efforts must be directed to both men and women at all levels of the educational continuum.
- Inhibitors and facilitators of career development occur at every stage of the educational ladder and can be identified.
- Training models can be created to change the attitudes and behaviors of educators and parents, but the models must attend to both the content of career socialization and development and the process by which change is effected in educational institutions.
- Developmental teams of counseling psychologists and educational practitioners can collaborate to produce effective experiential/cognitive training materials and models for K-12, community college, vocational-technical and college-university settings.

The project appears to go beyond the traditional career development theories in its concept of career socialization, defined as the "differential experiences," influences, and processes used to prepare females and males for the educational, occupational, and life-style roles and choices society has defined as being appropriate for their particular sex (Hansen, 1978, p. 5).

LEGISLATURE SUPPORT: NON-TRADITIONAL OCCUPATIONS

Legislative support for women entering non-traditional occupations are addressed to changing both the attitudes of employers, teachers, and counselors and the attitudes, interests, and skills of women themselves.

A series of legislative actions affecting minorities and women have been accumulating since the passage of the Civil Rights Act in 1963 (U.S. Department of Labor, 1973 a, c,; 1974 a, b, c). Title IX of the Education Amendments of 1972 made it illegal to exclude persons from federally funded educational training programs because of race or sex. Of particular interest to women seeking vocational and technical education were the provisions of the Education Amendments of 1976, revising the Vocational Education Act of 1972. The regulations for implementing these revisions (U.S. Department of Health, Education, and Welfare, 1977) are impressive in their specific attention to supportive services for women who wish to enter training for non-traditional occupations. The regulations are aimed at the following groups of women: persons who had been homemakers but who now, because of dissolution of marriage, must seek employment; persons who are single heads of households and who lack adequate job skills; persons who are currently homemakers and part-time workers but who wish to secure a full-time job; and women who are now in jobs which traditionally are considered jobs for females and who wish to seek employment in areas which are not.

Regulations require that action be taken to overcome sex discrimination and stereotyping in all state and local vocational education programs and that states adopt incentives to (a) encourage the enrollment of both women and men in non-traditional courses of study and (b) develop model programs to reduce bias and sterotyping in training for and placement in all occupations. Special courses for eligible women are to be established to help them learn how to seek employment and use available placement services. Counseling services are to be provided women entering and enrolled in non-traditional programs, on the nature of these programs, and on the ways of overcoming difficulties. Counselors also are to assist women in adjusting to new employment requirements.

The Vocational Technical Education Act, as amended in 1976, also enabled state funds to provide day care services for children of students in secondary and postsecondary vocational education. Funds are provided to states which must write a five-year plan approved by the federal government.

States under this legislation are encouraged to provide materials and information on the world of work which presents women entering, enrolled, or interested in non-traditional programs. Job development support services also may be carried out through bringing persons employed in non-traditional fields into the schools and providing opportunities for students to visit business and industry in order to give them a clearer understanding of the work scope and setting. Support funding also is provided in order to increase the number of women instructors for training in non-traditional occupations and to provide supportive models for trainees.

Legislative changes to remove restrictive aspects of the protective laws have benefited women in the crafts. In the past, protective legislation frequently prevented women from working overtime and from accumulating seniority. The Equal Employment Opportunity Commission (U.S. Department of Labor, 1974 b, c) stated that such laws do not take into account the special interests and abilities of some women and, therefore, on the basis of sex, are discriminatory. Recent rulings of the Commission hold that laws requiring special rest and meal periods of physical facilities for women are in violation of Title VII of the Equal Employment Opportunity Act. An employer must provide the same benefits for both sexes. Maternity leave with full re-employment rights became available to more workers with the passage of Title VII. A Department of Labor study (Citizen's Advisory Council on the Status of Women, 1974) indicated that 73 percent of employed women surveyed were receiving such leave. This change means that seniority accumulation would not be interrupted by maternity leave. Changes such as these also make work in the crafts more attractive. The impact of the Comprehensive Employment and Training Act--CETA (Sexton, 1977) was reviewed by the National Academy of Sciences (1976, pp. 18-19). The report indicated that: "Although CETA replaced the earlier mandated categorical programs to encourage greater flexibility, local prime sponsors are continuing such programs largely unchanged. The character of manpower programs is changing from one preoccupied with the intractable employability problems of the disadvantaged to one increasingly concerned with the immediate cyclical problems or the unemployed generally. The manpower planning process is better integrated with the local administrative power structure but the formal planning documents are generally not well developed. By repeated modifications, plans are adjusted to mirror experience. Consequently, the planning process tends to follow rather than lead program development."

Sexton (1977) examined the impact of CETA on women in New York City projects and found that little attention had been given to the development of non-traditional occupations. She recommended that data on the female experience in CETA needs to be collected and analyzed.

The American Personnel and Guidance Association (Pinson, 1978) urged the strengthening of the number of professional counselors represented in CETA programs who would address special needs of women. However, this request has not been acted upon at the time of this writing (summer, 1978).

One report described CETA efforts for women in a more positive light. B. Mitchell (1977) described a seventeen week training program developed through a CETA grant by the Lansing, Michigan, Community Tri-County Manpower Consortium, Lansing Community College, and Local 665 of the International Brotherhood of Electrical Workers. The program was designed to provide basic skills and knowledge necessary to be accepted by the union as apprentice electricians.

WOMEN CHOOSING NON-TRADITIONAL, NON-PROFESSIONAL OCCUPATIONS

Hedges and Bemis (1974) reported that more women have been entering the crafts each year since 1970. The period from 1900 to 1960 was static. The participation of women during that period fluctuated from two to three percent except for World War II when participation rates reached five percent. In 1974 women's participation rose to five percent. Twelve percent of those enrolled in trade schools were women. Table 4 indicates a selected set of data showing women's increasing participation in skilled trades.

Table 4. Increased Participation in Selected Skilled Trades

Skilled Trades	Percent of Women Participation 1960	1970
Aircraft Mechanic	1.5	2.9
Auto Mechanic	.4	1.4
Blacksmith	.5	2.4
Boilermaker	.2	1.3
Cabinetmaker	1.3	5.1
Carpenter	.4	1.3
Dental Laboratory Technician	4.3	22.7
Electrician	.7	1.8
Machinist	1.3	3.1
Metal Rollers and Finisher	4.2	6.4
Metal Tool and Die Setter	.6	2.6
Motion Picture Projectionist	2.2	4.2
Painter	1.9	4.1
Printing Press Operator	5.8	8.5
Sign Painter	4.6	8.5
Stonecutter	2.0	7.0
Telephone Installer and Repairer	2.0	3.5

Source: Hedges & Bemis, 1974

Hedges and Bemis further noted that the jobs of baker, bookbinder, decorator, furrier, optician, lens grinder and tailor now have more than fifteen percent participation by women. Table 5 provides projections on job opportunities in the crafts for the 1970's.

Table 5. Selected Expanding Craft Occupations: Average Annual Openings to 1980

Craft Occupations	Total Employment-1970	Average Annual Openings to 1980
Air conditioning, refrigeration, and heating mechanic	115,000	7,900
Aircraft mechanic	140,000	6,000
Appliance repairer	220,000	11,000
Automobile mechanic	610,000	23,300
Business machine repairer	80,000	6,000
Electrician (construction)	190,000	12,000
Industrial machinery repairer	180,000	9,000
Instrument maker-mechanical	8,000	400
Instrument repairer	95,000	5,900
Operating engineer (construction machinery operator)	310,000	15,000
Plumber and pipefitter	350,000	20,000
Television and radio service technician	132,000	4,500
Truck and bus mechanic	115,000	5,200

(Note: Data on the percent of women employees was not available.)

Source: U.S. Department of Labor, Women's Bureau, 1973b

The question to be raised at this point is why, after sixty or more years, are women beginning to increase their participation in craft occupations? Several reasons are given in Hedges and Bemis (1974), U.S. Department of Labor, Women's Bureau (1974d), and Raphael (1974). The following reasons were cited most frequently: because of automation, physical strength is becoming a less important factor for

many skilled trades; women have become more aware of the good salaries these jobs provide; and legislation has helped reduce discrimination.

Training in community colleges historically has been marked by sex role stereotyping. Women are encouraged to take programs in business and home economics but discouraged from preparing for occupations in the shop trades. Briggs (1974) reported that 98.5 percent of enrollees in Wisconsin industrial classes in 1973 were male. However, Hedges and Bemis (1974) indicated that this picture is changing and that publicly supported preapprenticeship programs are beginning to prepare more women for skilled trades. In 1972 women represented twelve percent of the enrollment nationally in these programs. In Wisconsin alone, in 1973, 500 or more women were enrolled in training programs for air conditioning repair, auto body repair, auto mechanics, aviation occupations, carpentry, electricity, construction and maintenance, electrical occupations, electronic occupations, metal working occupations, small engine repair and woodworking. By 1974, 150 women were enrolled in previously all male technical schools in Milwaukee.

Technical schools have until July 1979 to achieve non-discriminatory admissions under provisions of Title IX of the Education Amendments of 1972. Many of these programs overlap with those cited by the U.S. Department of Labor, Women's Bureau (1973b) as likely to have increased employment in the late 1970's, notably, air conditioning repair, auto machanic, aircraft mechanic, electrician, and appliance repair.

Two studies compared craft-related aptitudes of men and women. Durkin (1972) reported that the Human Engineering Laboratory of the Johnson O'Connor Research Foundation found no significant sex differences in the majority of aptitude and knowledge areas studied. Droege (1974) presented data from the United States Employment Service gathered over a period of years by the General Aptitude Test Battery administration to men and women. His data revealed little in the way of significant differences. It has been known that women often excel in finger coordination and eye/hand coordination required for many of the skilled trades. Physical strength requirements sometimes were a deterrent in the past but, in many trades, physical demands actually are no higher than for housework. (See *Dictionary of Occupational Titles, 1977*). Automation is reducing this requirement in other trades (Hedges and Bemis, 1974).

Some of the recent increase in interest in the crafts may be related to job function and personal factors. A person employed in a skilled trade is more autonomous, may have a sense of achievement (i.e., a chance to work with one's hands and produce a product), and may have

better pay for clerical or other traditional "women's jobs." Social changes in sex role expectancy also have made the skilled trades more inviting.

Non-professional, male dominated occupations have been studied by Kane et al. (1976). Their sample includes 860 females enrolled in non-traditional training. They examined the characteristics of women in both non-traditional and traditional occupations and found that parental characteristics were essentially similar. An interesting finding was that the increased earnings in non-traditional occupations were not the primary motivator. Ninety-six percent of these women considered interest and ability as the most influential factors in encouraging them to enter non-traditional roles. Many educators have thought salaries were the selling point but the students apparently disagreed. Kane and her colleagues also found that women enrolled in non-professional, non-traditional occupational training had been more influenced by male rather than female teachers in their choice of occupation. However, members of the immediate family (primarily the mother) were an even more important influence.

SUPPORT PROGRAMS FOR NON-PROFESSIONAL, NON-TRADITIONAL OCCUPATIONS

The support programs described below, funded by the federal government, have directed their effort primarily to changing attitudes and skills of women in order to facilitate their entry into non-traditional occupations. A secondary emphasis has been to change attitudes and behaviors of employers, counselors, and education.

The Women and Girls Employment Enabling Service program (Thomas and Dickey, 1974) was reviewed by Sexton (1944). This program which had the specific goal of increasing access to non-professional, non-traditional occupations for women offered counseling and job referral services. In addition, staff worked with employers to discuss the benefits of hiring women. Services included child care and job search skills. Not surprisingly, the findings indicated that women clients were more satisfied when they obtained a job, that is, compared to obtaining training and counseling. Eighty-five women were placed in jobs over a two year period; earning increases averaged $1,750 per year. The project was able to obtain jobs for women in non-traditional occupations such as security guards and blue collar worker in industries. They placed the first women law clerks in Memphis, the first in the school bus system, and the first bartenders in a national motel chain. The project also recruited female applicants for apprenticeships. The project concentrated on changing attitudes of employers

and unions toward women entering such occupations. It was reported that some employers changed their job descriptions and testing policies in order to employ more women (Sexton, 1977). In addition, this project documented the value of using volunteers to increase community impact. The report stressed the desirability of investing effort in influencing the established community institutions such as the schools, chambers of commerce, and local industries.

The Wisconsin Women in Apprenticeship Project (Briggs, 1974) developed a film ("Never Underestimate the Power of a Women") that has been used with employers and is intended to serve two purposes: to explode myths about alleged unsuitability of women in a wide range of industrial jobs and to motivate attitudinal changes in employers in order to open apprenticeship programs to women. Increased involvement of women in Wisconsin in non-traditional apprenticeships suggests that their efforts were somewhat successful. One result of showing the film to employers and unions was reported to be a change in the attitude that because men are "breadwinners" they should be employed in times of high unemployment. Briggs indicated that it was a revelation to these employers that many women are heads of household and are, in fact, the only "breadwinner" for a family.

J. Mitchell (1977) described federal efforts to improve and expand apprenticeship opportunities by concentrating on industries other than construction, improving federal-state partnership efforts in apprenticeships, establishing community apprenticeships councils, starting industrial promotion campaigns, and encouraging apprenticeships in federal government.

A contribution made by the Wisconsin Women in Apprenticeship Project (Briggs, 1974) was to initiate an investigation of the *Dictionary of Occupational Titles* (U.S. Department of Labor, 1965) job classification system. The investigation identified several women's jobs that require skills related to mothering and homemaking which were undervalued for complexity. (Note: The DOT classification system used three digits to classify jobs on a complexity scale from zero to eight. The complexity of one's on the job involvement with data, people and things was used in part to determine pay rates; thus, the lower the complexity level rating the lower the salary for a particular job. The occupations of foster mother and child care attendant were classified in relation to involvement with people at the same level as rest room attendant and parking lot attendant, that is, the lowest level!) Such undervaluation in the classification system made these jobs ineligible for classification for apprenticeship training benefits. Some of the titles were: foster mother, rest room attendant, practical nurse, home health aide, nursery school teacher, and

parking lot attendant. The fourth edition (1977) of the *Dictionary* reflected the results of the effort initiated by the Wisconsin project. Revisions included changes in over 3,000 titles, a majority of which were in the service and structural work groups. Skill codes also were upgraded for several traditionally female occupations. In the opinion of Department of Labor personnel, the desexing of titles has had a significant effect on the way personnel in the Employment Services talk about jobs (Sexton, 1977). Some of the changes were from foreman to supervisor, from draftsman to drafter, from repairman to repairer, patrolman to police officer, seamstress to sewer, and stewardess to flight attendant.

APPRENTICESHIP TRAINING

Apprenticeship training programs are the major mobility channel for persons with limited formal education and/or financial resources. For disadvantaged women, such programs offer a route to higher income and work satisfaction. In order to qualify as an apprentice a minimum of two years of on-the-job training is required in skills not obtainable in academic classrooms.

Several organizations and labor unions have acted on behalf of women to make it possible for them to enter such programs. Hedges and Bemis (1974) reported that the National Association of Women in Construction has a twelve-week course in the basics of construction designed to upgrade the skills of women working in the industry and to train high school women in construction. The United Community Services Demonstration and Development Fund in San Diego offers a twenty-week training program in the repair trades. The YWCA in Denver and the Advocates for Women in San Francisco both work with employers and unions to place women in apprenticeships. The United Automobile Workers Union has 200,000 women members and was instrumental in removing the protective laws for working women from state statutes. Previously protective laws prevented many women from working overtime and from accumulating seniority. The Electrical Workers Union also has a women's department which takes an active role in extending the rights of employed women.

In 1974, more than 3,000 women members of fifty-eight unions voted into existence a national organization to work for women's rights within the trade union movement. The organization, the Coalition of Labor Union Women, is committed to extending to all workers the protection of regulations originally aimed at protecting women, for example, mandatory limits on number of hours worked, breaks during the workday, and seating for workers.

A journeywoman machinist and civilian employee at Robbins Air Force Base in Georgia (the first woman to complete a machinist apprenticeship program run by the Air Force) indicated that this is not unattractive work for a woman (*Manpower*, 1974). The National Steel and Shipbuilding Company in San Diego hired more than one hundred women to fill such non-traditional jobs as burners, welders, pipefitters, sheetmetal workers, forklift operators, and carpenters (Brown, 1975). Briggs (1974) reported on women who entered non-traditional apprenticeship trades and found that the "dirty" work aspect was offset by greater autonomy offered by the jobs.

CONCLUSIONS

SUMMARY

Support services aimed at changing the interests and behaviors of women in order to increase their participation in non-traditional occupations were described. Some services were in the form of resource materials such as those published by CATALYST, the American College Testing Program, and the College Entrance Examination Board. Other programs, such as the one at the Boston University School of Business, provided child care on a free or subsidized basis. The Vocational Education Act as amended in 1976 was found to be promising in that it encouraged training institutions to use state funding to provide child care services for women enrolled in courses. Support groups for women in non-traditional fields were described in the program for engineering students at Purdue, the Association for Women in Math, the National Association of Women in Construction, and the Coalition of Labor Union Women.

Several support services offered advocacy assistance to women wishing to enter training or employment in non-traditional fields. Such a program as the Wisconsin Women in Apprenticeship is among those cited. Information networks established to inform women about job opportunities, training, research and support services have been established. Examples cited were the Women's Educational Equity Communication Network, the Department of Labor's Women's Bureau, and the Project on the Status and Education of Women.

Several support services were described which aimed at teaching women various skills deemed important to their success in non-traditional occupations. The National Science Foundation programs were

aimed at upgrading science and math skills of women who wished to reenter the labor market. Other programs related to the math field were math phobia clinics at secondary, postsecondary, and community agencies. The Purdue program for engineering students provided skill training for women students in aeronautical, electronic and mechanical skills. Programs were described which offered assertion training and leadership skills. Decision-making and planning skills were provided to help women combine their multiple roles in such programs as the one at Purdue. The Project on the Education and Status of Women described career orientation workshops conducted for women entering or reentering college or thinking about their future careers. Several programs described the use of role models, peer advocates, and information dissemination in increasing the motivation of women for entering non-traditional fields.

Support services aimed at increasing the participation of women in professional, non-traditional occupations were described which aim at both women themselves and at career socialization agents in their environment. Affirmative action legislation, Title IX of the Education Amendments of 1972, the Women's Educational Equity Act of 1974, the Vocational Technical Education Act as amended in 1976, the Equal Employment Opportunity Commission, and the Equal Pay legislation have all contributed to this end. Projects growing out of this legislation, such as BORN FREE, specifically were aimed at changing the attitudes and behaviors of career socialization agents. A project in the U.C.L.A. School of Dentistry was described which successfully influenced counselors and educators to recruit women students more actively. The Wisconsin Women in Apprenticeship project was found to affect positively the attitudes of employers toward hiring women in non-traditional occupations.

IMPLICATIONS FOR PRACTICE

Research by Holland and others indicated that career satisfaction is related to finding an occupation which matches a person's basic interest pattern. When a person's interests, abilities, and values are in harmony with one's occupation, the likelihood of happiness and fulfillment is great. By encouraging women to explore the widest possible range of occupations, interests may develop which lead some to choose non-traditional occupations. The key point is that since interests are learned, interest in non-traditional occupations could be developed by providing a full range of experiences with traditional male, as well as female, activities.

Follett et al. provided an excellent review of the career socialization of women. In order to reduce the effect of career socialization on the attitude and interest of women, it was suggested that women and girls be given the opportunity to explore a full range of occupations. Although such exploration is easier to encourage at the elementary and secondary school levels, it is not inappropriate at the postsecondary level. Exploration might take the form of reading, talking with women employed in non-traditional fields, taking a course, working in parttime jobs or volunteer activities. Such activities are appropriate prior to choosing an occupation. Counselors can help women optimize their career development by encouraging exploratory and implementation tasks when each are appropriate.

The dean of the law school at the University of Illinois is quoted as saying that girls interested in becoming lawyers should learn football. "You will have to learn to fight and claw in the courtroom and it's hard for women to compete. Also, at social gatherings you can talk a man's game to men." (Office for Women's Resources and Services, 1978) She also encouraged women to enroll in a course in assertive training before entering law school.

The review of support services intended to increase the participation of women in non-traditional occupations did not turn up many substantive findings. Most of the research with college undergraduates or reentry women in higher education examined counseling programs of short duration. To expect dramatic changes in women after such short exposure to new ideas is perhaps to expect too much. Career socialization begins at birth; erasing its effect takes a substantial investment of time. One example is the differential effect of the Auxiliary Informative Material procedure developed by Birk and Tanney. As used by Cooper, AIM was effective only in increasing the level of career choice. However, when the procedure took the form of a weekend workshop with opportunities for discussion, it appeared to be more effective.

Several studies noted that women who have chosen non-traditional occupations tended to be more independent and self-initiating than those who do not. This suggests that efforts be made to encourage independence in females from a very early age. BORN FREE's projected curriculum to train parents is promising in this regard. However, it is important to recall that independence as a characteristic is not necessarily the cause of women choosing non-traditional occupations; rather it may be a manifestation of a quality of those who choose to enter a career where they are a minority.

Recent changes with respect to educational and employment opportunity suggest that educators take steps to ensure that women be made aware of these new career and training possibilities. Legislation requiring equal access to training has created opportunities for women of lower socioeconomic background. Counselors must provide information about opportunities for training and employment, financial aid, and child care to persons in need of such information. Wherever possible, educators and counselors also should lend their support to implementing equal access in the agencies they represent, namely, schools, clinics, universities, and industries. Increasing support for the educational and career aspirations of women may be as important a change agent as efforts directed toward changing their attitudes and work related skills. Educators and counselors are encouraged to invest in both types of change.

Inadequate child care arrangements make it difficult for many women to feel "free" to work. The research indicates that a majority of women prefer to place their children in non-institutional care, that is, with neighbors or relatives. This preference suggests that public support for child care should offer a subsidized home care option to women.

The role of mathematics as a critical factor for those entering non-traditional occupations requiring technical and mathematical skills should be given serious attention. Programs to reduce "math anxiety" at high schools and colleges should be supported. In addition, programs intended to show the relationship of mathematics to applied fields is desirable.

Women should be encouraged to unionize. Since unionization has had a major impact on the benefits and rights claimed by men, it is reasonable to assume that the same would follow for women.

New labels for the term "manpower" should be considered. Human resources may be the best substitute. Others have suggested the term "laborpower."

The need continues for placing more women in policy and management positions as a means of directly influencing institutional policies on women. Research is needed to identify barriers to women's employment at these policy making levels. Women at such levels are needed particularly in agencies concerned with vocational education, licensing, apprenticeships, human resources, career guidance, job placement, personnel, and professional education.

Perhaps the most important practical implication is to encourage support for new and emerging projects aimed at reducing sex bias and at increasing women's entry into non-traditional occupations. Such projects as BORN FREE, currently being field tested in Minnesota, should receive support in other states. Vocational and Technical Education Sex Equity projects begun in 1977 in most states should begin to show results if policy makers, educators and counselors are alert to implementing these projects at the level the law intended. Projects funded in 1978 by the National Institute for Education to provide support for women in educational research will be important ones to watch in the future.

PRIORITIES FOR RESEARCH

The analysis above has indicated that research efforts should concentrate on the evaluation of large scale efforts such as BORN FREE, the Women's Educational Equity Communication Network support projects, and the new state projects aimed at reducing sex bias in vocational technical education. Evaluation should focus on case studies in an attempt to identify successful factors. Evaluations should focus not only on increases in the number of women choosing to enter training in non-traditional fields, but also on the appropriateness of these choices based on what is known about the participating women's interests, values, and aptitudes. Related dissemination efforts also are critical.

Follow-up studies are needed to see what happens to women entering non-traditional programs. Some studies have looked at the proportion of women graduating from these programs compared to the numbers entering. Follow-up studies need to look at women in their work roles to determine retention rates and to describe their experiences as a minority. Research to identify which factors contribute to women graduating contrasted to those dropping out is important. Similarly, studies of which factors contribute to women staying in non-traditional occupations compared to those dropping out of the workforce is essential.

Some of the counseling programs reviewed were characterized by a wide variety of support services. Research on the nature of these services, especially child care, financial aid, and flexible scheduling for both training and employment would provide useful clues on which aspects are most helpful. Such efforts would provide evidence of how effective support services help women choose and stay in non-traditional occupations.

Research is needed on the role career socialization plays in the career choices of women. To the extent that women believe they have a primary responsibility for child rearing, they will continue to view their career options differently from men. Research on the effectiveness of high school programs to help students with dual roles of home and career should provide clues on how to help women optimize their career potential. Such research might include studies of programs which work with girls exclusively compared with those which worked with both high school girls and boys.

Comparative studies on different change strategies is an important research effort. The BORN FREE project has adopted the change strategies advocated by Havelock (1963). Other projects have adopted strategies which are more abrasive and disruptive but which have been found to be effective for certain types of changes. Comparisons of these different approaches would be most informative for future programs aimed at women's equity.

Research is needed on dual working couples and the various strategies they employ to ensure equality for their careers. A special issue of the journal *Psychology of Women Quarterly* is planned for late 1978 presenting research on this issue. While it may be inappropriate to suggest that more research be done when this issue is pending, it seems reasonable to expect that achievement of equity for dual working couples will be an important research topic for a number of years.

CONCLUDING STATEMENT

Positive trends were identified in several non-traditional occupational fields (engineering, medicine, dentistry, law) where female enrollments in professional training have increased dramatically in the past decade. These increases were seen as the result of several factors rather than the result of any one programmatic effort. Factors identified as facilitating these trends were legislation and efforts by states and institutions to recruit more women. Other promising projects were aimed at influencing educators, parents, and students to change their attitudes and behaviors.

Support for equal rights legislation has grown with changes in our technological advances related to health, conception, and homemaking (see Hoffman, 1977). These changes over the past seventy-five years have established the groundwork for women entering the marketplace on a more equitable basis. Nevertheless, old attitudes, beliefs, and practices continue to be adherred to. *Efforts now should focus on re-educative efforts with parents, teachers, policymakers, employers, and children of both sexes in order to help them value the new work opportunities for more than one-half of our population.*

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III. RESOURCES BY FIELD

Although some of these materials were written for recruiting women to a particular school, the materials may be of use to other institutions considering the development of similar recruiting materials. Additionally, the general information in the materials is likely to be helpful to persons considering that field, whether or not they apply to the specific institution.

Medicine and Health Fields

The percentage of women enrolled in medical schools has climbed consistently over the past few years. Women comprised 9.0 percent of the enrollment in medical schools in 1969; 12.8 percent in 1972, and 15.4 percent in 1973. The Association of American Medical Colleges reports that in 1977, women accounted for 22 percent of the total enrollment and were 25 percent of the freshman class.

The National Center for Education Statistics reports that the percentage of women enrolled in schools of veterinary medicine has increased from 8.8 percent in 1969-70 to 20.4 percent in 1974-75. The percentage of women enrolled in dental schools increased from 1.4 percent in 1969-70 to 7.0 percent in 1974-75.

The following publications were written especially for women considering a medical career:

Medicine: A Woman's Career is a booklet published by the American Medical Women's Association, an organization of women physicians. The booklet offers advice on educational preparation, medical curricula requirements, and sources of financial aid. 12 pages. COST: $1.00 prepaid. Bulk rates available. ORDER FROM: AMWA, 1740 Broadway, New York, NY 10019.

Why Would a Girl Go Into Medicine? Medical Education in the United States: A Guide for Women, by Margaret A. Campbell, M.D., is based on a survey of women's experiences in medical schools across the country. Dr. Cambell discusses her findings and suggests strategies for coping with and eliminating sex discrimination in medical schools. 126 pages. COST: $3.50. ORDER FROM: The Feminist Press, Box 334, Old Westbury, NY 11568.

Source: Project on the Status and Education of Women (1977)
(Reproduced with permission of the Project)

Women in Medicine, published by the Stanford University School of Medicine discusses the participation of women in medicine in the United States and gives particular details on the Stanford Medical School program. 15 pages. COST: Single copies free upon request. ORDER FROM: Stanford University School of Medicine, Stanford University, Palo Alto, CA 94305.

Pathways to a Career in Dentistry is a sourcebook compiled and published by Technical Education Research Centers and Tufts University School of Dental Medicine. Directed to women and minority group members, the courcebook describes dentistry, details the admissions process for dental school, and gives lists of general resources, films and exhibits, dental societies and accredited dental schools in the United States. 125 pages. COST: $5.00. ORDER FROM: Technical Education Research Centers, 44 Brattle St., Cambridge, MA 02138.

The following studies, written for purposes other than recruiting, may nevertheless be useful in planning workshops, seminars and other activities related to recruiting women into health and/or medical fields.

Men and Women in the College of Veterinary Medicine: Their Comments About Student Services, is a report prepared by Charlene V. Follett, Darwin D. Hendel, and Wendy L. Andberg Klohs of the University of Minnesota. The report is based on a survey of the university's veterinary medical students, their educational experience and their career expectations. The report focuses on students' attitudes about career and family, interactions with faculty and classmates, perceptions of differential treatment based on sex, and problems encountered in the college. 87 pages. COST: $1.00. Supply limited. ORDER FROM: Wendy Andberg Klohs, College of Veterinary Medicine, 301 Veterinary Science Bldg., University of Minnesota, St. Paul, MN 55101.

An Exploratory Study of Women in the Health Professions Schools, Volume I, prepared for the Women's Action Program of the Department of Health, Education and Welfare, focuses on barriers to women's participation and success in eight health professions: medicine, osteopathic medicine, dentistry, veterinary medicine, optometry, podiatry, pharmacy and public health. The study's central purpose was to develop conceptual models of recruitment, admissions and other programs to maximize equal opportunities for women. The report contains data analysis, findings, conclusions and recommendations. 420 pages. COST: $4.80. ORDER FROM: Superintendent of Documents, Government Printing Office, Washington, DC 20402. (A 14-page executive summary and separate reports for each of the eight professions is also available. For further information write Women's Action Program, Department of Health, Education and Welfare, Washington, DC 20202.)

Additional information on women in medicine and health fields is available from:

American Medical Women's Association
1740 Broadway
New York, NY 10019

Association of American Women Dentists
435 North Michigan Avenue,
Suite 1717
Chicago, IL 60611

Center for Women in Medicine
The Medical College of Pennsylvania
3300 Henry Avenue
Philadelphia, PA 19129

Women's Veterinary Medical Association
Dorothy Gustafson, Executive Secretary
2175 West Highway No. 36
Roseville, MN 55113

Law

The number of women enrolled in law school more than tripled between 1969-70 and 1974-75. The National Center for Education Statistics reports that women were 7.5 percent of first year enrollments in 1969-70 but by 1974-75, they comprised 23.4 percent of first year enrollments. Several law schools have published booklets to encourage women to prepare for careers in law:

Women and Law, from the Stanford Law School, discusses opportunities in the field, and destroys some of the myths about women in the profession. 7 pages. COST: Single copies free. ORDER FROM: Stanford Law School, Office of Admissions, Stanford, CA 94305.

Wanted by the Law: Women was written by the Boalt Hall Women's Association of the School of Law at the University of California, Berkeley. The booklet describes various specializations in law, and gives details about application and admission procedures. The booklet also deals with the unique problems of "older" women applying to law school. 15 pages. COST: Single copies free. ORDER FROM: Boalt Hall Women's Association, School of Law, University of California, Berkeley, CA 94720.

Women and the Law, published by the Golden Gate Law School Women's Association, includes special sections on women with children, minority women, and older women planning careers in law in addition to information on admissions, financial aid, job placement and housing. Although written for the San Francisco Bay area, much of the information is transferable. 14 pages. COST: Single copies free, ORDER FROM: Golden Gate Law School Women's Association, 536 Mission St., San Francisco, CA 94105.

Additional information on women in the law profession is available from:

Section on Women in Legal Education
Association of American Law Schools
Jane M. Picker, Chair
Cleveland State University
Cleveland, OH 44115

Engineering and Science

The number of women studying engineering in the United States has more than quadrupled in the last five years. Major universities well known for engineering education have reported startling increases in the number of women enrolled. For example, Purdue University (IN) had only forty female engineering students in 1967, but in 1975, the number had increased to about 462, including some women graduate students. The U.S. Engineering Manpower Commission reports that in 1975, women comprised nine percent of the freshman engineering class.

The increase of women in science has been more marked. The National Science Foundation reports that the number of female graduate science students enrolled full time rose thirteen percent between 1974 and 1975. This was more than twice the rate of increase in male students. (Even so, there are more than three times as many male as female students in graduate programs in science.) This increase in women science majors is also reflected on the undergraduate level. The Women's College Coalition (a group of 65 colleges with enrollments of predominantly women) reports dramatic increases in course enrollments in biology, chemistry and mathematics.

The following materials have been used by many institutions to interest women in engineering and science:

Consider the Possibility, prepared by the Stanford University School of Engineering, offers reasons for women to consider careers in engineering. Quotations from Stanford women engineering students help to dispell some of the myths about the field. 14 pages. COST: Single copies free. ORDER FROM: School of Engineering, Stanford University, Stanford, CA 94305.

Womengineer, written by Sara Jane Neustadtl for the College of Engineering of the University of Illinois at Urbana-Champaign, tackles myths about engineering and feminity head-on. The author describes the necessary qualities for engineering, what to expect as a student, how to apply to a college of engineering, and what it is like to be a professional engineer. 16 pages. COST: $.25. ORDER FROM: Engineers' Council for Professional Development, 345 East 47th St., New York, NY 10017.

Women's Work: Engineering, is a sound and color 16mm film which explores the experiences of being an engineer and a woman from the perspectives of students, faculty, and professionals. Guides for the teacher and student accompany the film. 26 minutes. COST: Five-day rental, $30.00; purchase, $295. Educator's guide, $1.00 each; student guide, $.50 each. ORDER FROM: MIT Center for Advanced Engineering Study, Dept. 4, Room 0-234, Massachusetts Institute of Technology, Cambridge, MA 02139.

Women in Engineering: Directory of College/University Programs, prepared by the Women's Action Group of the American Society for Engineering Education, describes programs in 115 schools. Designed for use by high school counselors as well as advisors in institutions of higher education, the booklet gives information on scholarships and fellowships for entering women students and graduate women; conferences for high school women sponsored by the institution during the academic year; summer program for high school women; and the availability of special recruiting material and other support programs. First-year and total enrollment of women for each institution is given. 32 pages. COST: $.50 prepaid. ORDER FROM: American Society of Engineering Education, Suite 400, One Dupont Circle, Washington, DC 20036.

I'm Madly in Love with Electricity and Other Comments About Their Work by Women in Science and Engineering is a career booklet published by Lawrence Hall of Science of the University of California, Berkeley. The booklet includes quotes and photographs of seventy women who work in private corporations, government laboratories, and colleges and universities. Also included are the names and addresses of 160 women scientists and engineers in California who are willing to act as resource people to students, teachers and parents. The booklet also lists publications and organizations where additional information may be obtained. 37 pages. COST: Single copies free; additional copies $1.00 each. ORDER FROM: Regents, University of California, Lawrence Hall of Science, University of California, Berkeley, CA 94720, Attn: Careers.

"Recruiting and Keeping Women Engineering Students: An Agenda for Action" by Betty A. Sproule and Harold F. Mathis in *Engineering Education*, April 1976, discusses some proven techniques used to attract women to engineering and to help retain those women after they are enrolled. COST: $.50 prepaid. ORDER FROM: American Society for Engineering Education, Suite 400, One Dupont Circle, Washington, DC 20036.

"How Colleges Try to Attract More Women Students" by Donna S. Frohreich in *IEEE Transactions on Education*, Vol. E-18, No. 1, February 1975, reviews efforts made to recruit women and some of the problems encountered in retaining women students. The author outlines what an institution must do to initiate and carry out a successful recruiting program for women. 6 pages. COST: $.30 per page for Xerox copies, plus $3.00 for handling and postage. ORDER FROM: Engineering Societies Library, 345 E. 47th St., New York, NY 10017

Women in Science and Technology: A Report on an MIT Workshop prepared by Edith Ruina, targets secondary schools and employers as the institutions that can bring about increases in the numbers of women in technical fields. The report outlines proposals for changes, calls for cooperative programs between employers and institutions, and provides many recommendations that can be utilized by colleges and universities as well as high schools to interest women in science and Technology, Room 10-140, Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge, MA 02139.

Women in Science and Technology: Careers for Today and Tomorrow answers such questions as "why haven't more women considered careers in science and technology?", "what characterizes young women who become scientists and technologists?", "are careers compatible with family life?", "what steps can you take to plan a successful career?" Designed to stimulate interest in scientific and technical careers, the booklet includes pictures of women in those fields, and a list of resources for further information. 16 pages. COST: $1.50. Bulk rates available. ORDER FROM: American College Testing Program, Publications Dept., 2201 North Dodge Street, P.O. Box 168, Iowa City, IA 52240.

Women in Science and Engineering: WHY NOT, published by Women in Science and Engineering (WISE) at California State University, Northridge, describes the fields of biology, chemistry, computer science, engineering, mathematics, and physics, and gives statistics on the participation of women in those fields. Required high school background is given for each discipline, and there is a special section on the returning mature women student. 10 pages. COST $.35. ORDER FROM: Pat Wiggenhorn, Women in Science and Engineering and Computer Science, California State University, Northridge, 18111 Nordhoff St., Northridge, CA 91324.

"Experimental Project in Physics Education or New Avenues for Women" by Betty Pollak and Lee K. Little, in *The Physics Teacher*, Vol. 11, No. 7, October 1973, reports on the "new avenues" program at the University of Oklahoma which was established to interest and train women in physics. The recruitment, courses, laboratory, and counseling

components of the program are described and evaluated. The article also reports the evaluation of the program by faculty and graduate students and the "new avenues" students themselves. 10 pages. Back issues available. COST: $5.00 prepaid. ORDER FROM: American Institute of Physics, 335 East 45th St., New York, NY 10017.

Women in Science, a multimedia package, was prepared by Dinah L. Moche for the American Association of Physics Teachers. Six women with careers in science and engineering were asked such questions as "how did you pay for graduate school?" and "what would you advise a young girl considering a career in science?" The package includes audio cassettes, slides, biographical sketches and lists of references. COST: $27.50 per set. ORDER FROM: Publications Department, AAPT Executive Office, Graduate Physics Building, SUNY at Stony Brook, Stony Brook, NY 11794.

Science: A Man's Job? in the October 1973 issue of the *Professional Bulletin,* Vol. 1, No. 2, of the Federation of American Scientists. It reviews barriers preventing women from entering scientific fields, superstitions about women workers, and gives recommendations for educating and employing women in science. 8 pages. COST: Single copies free. Supply limited. ORDER FROM: FAS Professional Bulletin, 307 Massachusetts Ave., NE, Washington, DC 20002.

Women in the Sciences, A Library of Congress Science Tracer Bulletin compiled by Constance Carter, is a guide to sources chronicling the history and contributions of women in the field of science. Although not a recruiting publication, it is a useful guide to persons who may be preparing recruiting material or planning workshops and other activities. 11 pages. COST: Single copies free. Supply limited. ORDER FROM: Reference Section, Science and Technology Division, Library of Congress, 10 First St., SE, Washington, DC 20540.

Further information on women in engineering and science can be obtained from the following organizations:

American Society of Biological Chemists
Committee on Equal Opportunities for Women
Ann E. Kaplan, Chair
Building 6, Room 114
National Institutes of Health
Bethesda, MD 20014

American Society for Cell Biology
Women in Cell Biology
Contact: Susan Goldhor
Dean of Natural Sciences
Hampshire College
Amherst, MA 01002

Women in Science Program
National Science Foundation
1800 G St. NW
Washington, DC 20006

Office of Opportunities in Science
American Association for the Advancement of Science
1776 Massachusetts Ave., NW
Washington, DC 20036

Women Chemists Committee
American Chemical Society
1155 16th St., NW
Washington, DC 20036

Society of Women Engineers
United Engineering Center
345 East 47th Street
New York, NY 10017

American Society for Microbiology
Committee on the Status of Women Microbiologists
Elizabeth M. O'Hern, Chair
633 G St., SW
Washington, DC 20024

Women's Action Group
American Society for Engineering Education
Donna Frohreich, Chair
Assistant Professor of Engineering
University of the Pacific
Stockton, CA 95211

American Physical Society
Committee on the Status of Women in Physics
Caroline Herzenberg, Chair
National Laboratory
Building 316
Argonne, IL 60439

Association for Women in Science
1346 Connecticut Avenue
Suite 1122
Washington, DC 20036

Math

The Census Bureau reports that the percentage of women among undergraduate students majoring in mathematics or statistics increased from 34.3 percent in 1972 to 44.6 percent in 1974. Additionally, as more women consider scientific and technical careers, they will need to take mathematics courses as part of their preparation.

The following publications may be of special help in planning math anxiety programs or summer programs and conference workshops in mathematics:

Mathematics and Sex by John Ernest, examines student attitudes towards math from second grade to high school, the attitudes of math teachers, and sex differences in the extent of mathematics education in high schools and at the college and university level. The study draws some conclusions and presents recommendations for improving the math education of women and increasing the number of women mathematicians. 30 pages. COST: Single copies free. Supply limited. ORDER FROM: John Ernest, Mathematics Department, University of California, Santa Barbara, CA 93106.

"Furthering the Mathematical Competence of Women," by Nancy Kreinberg in *Public Affairs Report,* Vol. 17, No. 6, December 1976, analyzes obstacles to women's barriers. Kreinberg recommends ways to improve learning opportunities in mathematics for women. 6 pages. COST: Single copies free. ORDER FROM: Public Affairs Report, Institute of Governmental Studies, 109 Bernard-Moses Hall, University of California, Berkeley, CA 94720.

Parents: Protect Your Children's Future. Have Them Take Algebra and Geometry in High School, is a brochure prepared by The Third College of the University of California, San Diego. The brochure discusses attitudinal problems in mathematics and the necessity of the essential courses in mathematics for both non-college bound and college-bound students. Although brief, the brochure is especially useful with parents, counselors and students. Foldout. COST: Single copies free. ORDER FROM: The Third College, University of California, San Diego, La Jolla, CA 92093.

Further information on mathematics and math learning is available from:

Association for Women in Mathematics
Lenore Blum, President
Department of Mathematics
Mills College
Oakland, CA 94613

Math Clinic
Sheila Tobias, Associate Provost
Wesleyan University
Room 547 Science Tower
Middletown, CT 06457

Math Advisory Committee
Advisory and Learning Exchange
1101 15th St., NW
Washington, DC 20005

Math Anxiety Program
Lillian Faderman, Project Administrator
Assistant Vice President for Academic Affairs
California State University
Long Beach, CA 93740

Miscellaneous

Women in Non-Traditional Occupations--A Bibliography, prepared for the U.S. Office of Education, Department of Health, Education and Welfare, was designed for use by educators and planners in vocational education, but can be used by personnel in colleges and universities as well. The three sections of the bibliography list overview materials, materials on women in skilled trades, and materials on women in professional occupations. A list of other resources is included. 189 pages. COST: Single copies free. Supply limited. ORDER FROM: Bureau of Occupational and Adult Education, U.S. Office of Education, Room 4147, 400 Maryland Avenue S.W., Washington, DC 20202.

Careers for Women is a series of pamphlets published by the Women's Bureau of the Department of Labor. Each pamphlet describes the personal qualities and interests needed for success in each career, the advantages of each career, training needed and where to write for more information. Pamphlets are available on medical technology, urban planning, engineering, pharmacology, mathematics, technical writing, personnel and trade apprenticeships. COST: Single copies free. ORDER FROM: The Women's Bureau, Department of Labor, Washington, DC 20210.

IV. RESOURCES OF SPECIAL INTEREST TO MINORITY WOMEN

With some exceptions, Asian American, Black, Native American and Spanish speaking women are the minority of the minority population in scientific, technical and professional fields. Enrollment figures from the Department of Health, Education and Welfare show that minority women from all ethnic backgrounds are outnumbered by their minority brothers in professional school enrollment by more than three to one.

Because minority women generally have a higher labor force participation rate than do white women, it is especially important that they have access to training for well-paying occupations. Programs aimed at recruiting women and/or minority students may need special efforts to recruit minority women. Minority women and those that teach and counsel them may find helpful the various programs, publications and other resources directed toward recruiting minority students (as well as efforts designed to recruit women in general). Some of these resources are listed below.

Publications

AKA Heritage Series, brochures published by Alpha Kappa Alpha, a black sorority with a strong education and public service focus. The brochures present profiles of contemporary black professional women in business, medicine, dentistry, the judiciary and politics. The series has been widely distributed and used by teachers and counselors. COST: prices vary. FOR FURTHER INFORMATION: Alpha Kappa Alpha Sorority, 5211 South Greenwood Avenue, Chicago, IL 60615.

Black College Graduates and the Job Market in the South, 1980, by Eva C. Galambos, forecasts job opportunities for black graduates where blacks are especially underrepresented. Fields discussed include health specialities, engineering, accounting, computer science and public administration. 30 pages. COST: $1.50. ORDER FROM: Southern Regional Education Board, 130-6th Street NW, Atlanta, GA 30313.

The Black Collegian, Vol. 7, No. 4, March/April 1977, is a special issue on employment and includes an article on banking careers, a job index and occupational outlook. The periodical, published five times yearly, regularly reports on educational and career opportunities for black college students, and usually contains articles on individual blacks in non-traditional careers who are role models. COST: 2-year subscription, $10.00, 3 years, $12.00. ORDER FROM: Black Collegiate Services, 3217 Melpomene Avenue, New Orleans, LA 70125.

The Double Bind: The Price of Being a Minority Women in Science, by Shirley Mahaley Malcom, Paula Quick Hall and Janet Welsh Brown, is a report of a conference of 30 black, Puerto Rican, Native American and Mexican American women scientists. Conferees discussed the need for programs to support minority women in science, and the impact of sex stereotyping on minority women. The report covers the pre-collegiate experience, collegiate and professional education, career and professional experience, and the diversity of race and culture among minority women. Policy recommendations and a list of proposed projects are included. 70 pages. COST: $3.00. ORDER FROM: American Association for the Advancement of Science, 1515 Massachusetts Ave., NW, Washington, DC 20005.

Directory of Organizations in Engineering Programs for Minorities, published by the Committee on Minorities in Engineering, lists black, Hispanic and Native American engineering and technical societies, national and regional cooperative programs, scholarship and student service groups, and a variety of national educational and minority organizations. A bibliography on engineering education for minorities is also included. 116 pages. COST: Single copies free. ORDER FROM: Committee on Minorities in Engineering, Assembly of Engineering, National Research Council, 2101 Constitution Avenue NW, Washington, DC 20418.

The Howard Engineer, Winter 1976, is a special recruitment issue containing several articles by women students. The magazine is national in scope and is issued quarterly. The editorial staff is comprised of students, many of whom are women. 24 pages. COST: $.75. Annual subscription: $3.00. ORDER FROM: HOWARD ENGINEER, P.O. Box 668, School of Engineering, Howard University, Washington, DC 20059.

Minorities in Engineering, a quarterly newsletter published by the Committee on Minorities in Engineering, reports on programs and activities geared toward increasing the number of minority students and professionals in engineering. COST: Free subscriptions; contributions welcome. ORDER FROM: Committee on Minorities in Engineering, National Research Council, 2101 Constitution Avenue, Washington, DC 20418.

Programs

Banking Education Centers have been established at two predominantly black institutions, Howard University and Texas Southern University, to help attract and train qualified minority men and women for careers as bank officers. Funded by the American Bankers Association and the two universities, the program awards a degree in Business Administration with a concentration in Banking and Finance. For further information contact:

Georgellen Muriel
Center for Banking Education
School of Business and Public Administration
Howard University
Washington, DC 20059

Kenneth H. Cobb
ABA Center for Banking
Texas Southern University
Houston, TX 77004

The Earl Warren Legal Training Program of the NAACP Legal Defense and Educational Fund, provides scholarships for black students in law schools. The program also administers an internship program. For further information contact:

Jack Greenberg, Director of Counsel
NAACP Legal Defense and Educational
Fund, Inc.
10 Columbus Circle
New York, NY 10019

Minority Engineering Education Effort (ME^3) makes available data collected from minority high school seniors which might be of help to institutions developing programs and strategies to increase minority enrollment and reduce attrition. ME^3 also provides information for career days, guidance and counseling programs, and can help institutions identify minority students interested in engineering. For further information contact:

Carole Morning
Minority Engineering Education Effort
345 East 47th Street
New York, NY 10017

Minority Introduction to Engineering (MITE) a program involving twenty-seven colleges and universities, is designed to introduce students to engineering and to encourage more institutions to sponsor their own recruiting programs. The MITE programs consist of a two-week, no-cost, on-campus experience which gives students the opportunity to do course work, attend lectures, perform laboratory experiences, take field trips and talk to professional engineers. More than eighty-five percent of those students who have participated in the program are now either enrolled in engineering or have plans to do so. For further information contact:

MITE
Engineers' Council for Professional Development
345 East 47th Street
New York, NY 10017

Is There a Future in Health Careers for Minority Group Americans?, asks the National Council of Negro Women in the brochure describing the council's Health Careers Program. Designed to increase the representation of minority group Americans into health fields, the program consists of recruitment, career guidance and consultation, participant support services, and assistance in securing financial aid. For further information contact:

Health Careers Program
National Council of Negro Women
815 Second Avenue, Suite 901
New York, NY 10017

October 1977

(Note: Prices quoted are subject to change.)